

Name: \_\_\_\_\_

### at1124exam: Radicals and Squares (v815)

#### Question 1

Simplify the radical expressions.

$$\sqrt{99}$$

$$\sqrt{27}$$

$$\sqrt{75}$$

$$\sqrt{3 \cdot 3 \cdot 11}$$

$$3\sqrt{11}$$

$$\sqrt{3 \cdot 3 \cdot 3}$$

$$3\sqrt{3}$$

$$\sqrt{5 \cdot 5 \cdot 3}$$

$$5\sqrt{3}$$

#### Question 2

Find all solutions to the equation below:

$$4(x + 6)^2 - 2 = 62$$

First, add 2 to both sides.

$$4(x + 6)^2 = 64$$

Then, divide both sides by 4.

$$(x + 6)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 6 = \pm 4$$

Subtract 6 from both sides.

$$x = -6 \pm 4$$

So the two solutions are  $x = -2$  and  $x = -10$ .

**Question 3**

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 16x = -39$$

$$x^2 + 16x + 64 = -39 + 64$$

$$x^2 + 16x + 64 = 25$$

$$(x + 8)^2 = 25$$

$$x + 8 = \pm 5$$

$$x = -8 \pm 5$$

$$x = -3 \quad \text{or} \quad x = -13$$

**Question 4**

A quadratic polynomial function is shown below in standard form.

$$y = 4x^2 + 40x + 92$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .

$$y = 4(x^2 + 10x) + 92$$

We want a perfect square. Halve 10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 4(x^2 + 10x + 25 - 25) + 92$$

Factor the perfect-square trinomial.

$$y = 4((x + 5)^2 - 25) + 92$$

Distribute the 4.

$$y = 4(x + 5)^2 - 100 + 92$$

Combine the constants to get **vertex form**:

$$y = 4(x + 5)^2 - 8$$

The vertex is at point  $(-5, -8)$ .